

OSBORNE MINE

Detailed Design Report East Environmental Dam and Borrow Area 4 Dam

Prepared for:

chinova
resources

9/303 Coronation Dr, Milton, QLD 4064

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SLR 

EXECUTIVE SUMMARY

PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
12 Cannan Street
South Townsville QLD 4810 Australia
(PO Box 1012 Townsville QLD 4810)
T: +61 7 4722 8000
E: townsville@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Chinova (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
660.30104-R01-v1.1	2 June 2021	Lewis Smith/Jordan Mugford	Danielle O'Toole	Danielle O'Toole
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1 Introduction

SLR Consulting Pty Ltd (SLR) has been appointed by Chinova Resources Pty Ltd (Chinova) to undertake a detailed design report, with the inclusion of a Consequence Category Assessment (CCA), for the proposed expansion to the East Environmental Dam (East Dam) and Borrow Area 4 Dam in accordance with the Department of Environment and Science (DES) - *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*, 2016 (Version 5.02) (the Manual).

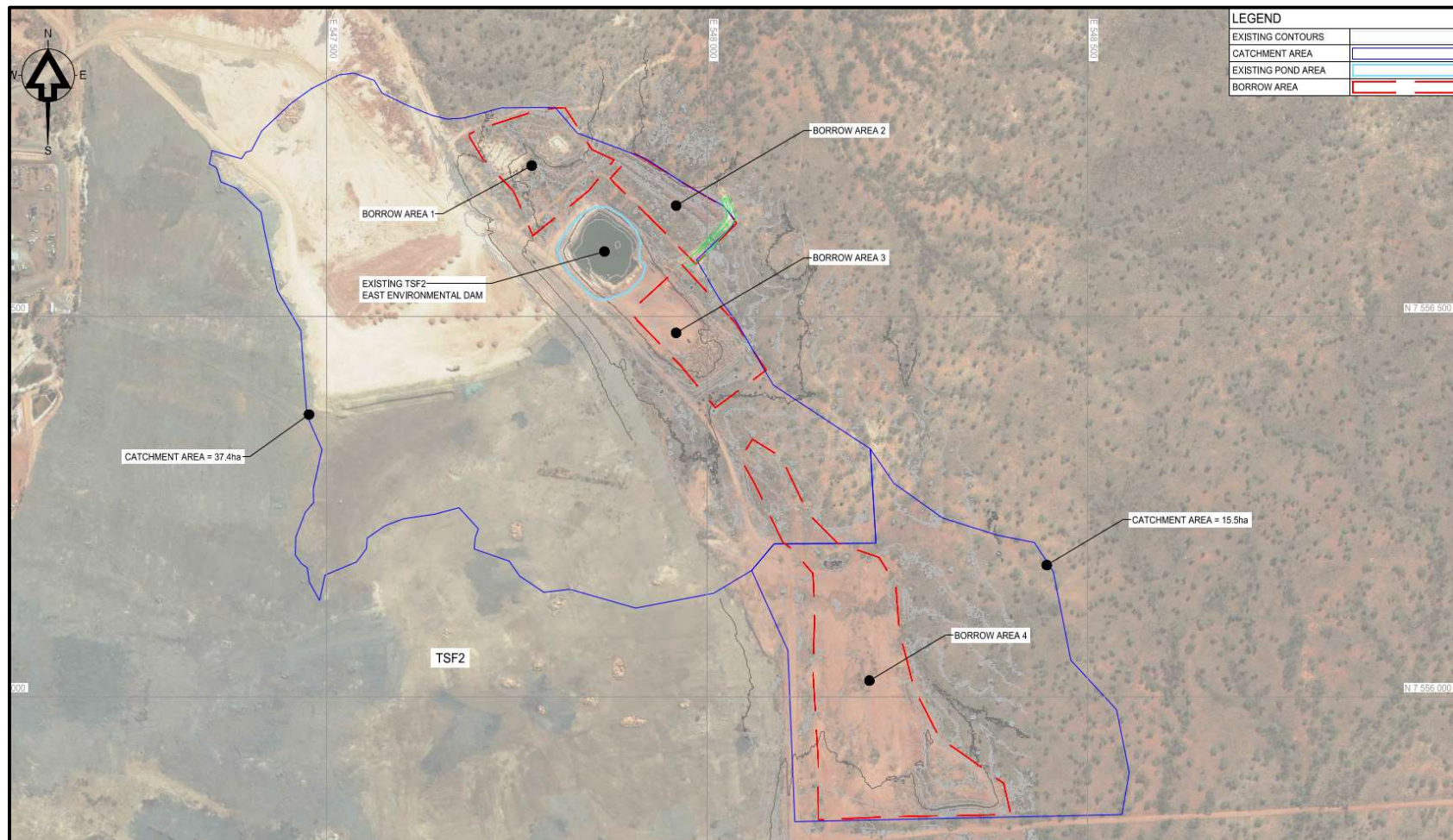
The proposed East Dam is being expanded to source materials for capping the adjacent Tailings Storage Facility 2 (TSF2) and will collect erosion and sediment laden surface water from TSF2 and its surrounds. Borrow Area 4 is to be used to source materials for capping the TSF2 and will be a below ground dam with very limited catchment area, used in the future for stock watering purposes.

2 Site Description

Osborne Mine is located in north-west Queensland approximately 195 km south-east of Mount Isa, in the south of the Cloncurry Shire. Both dams lie within Mining Lease 90040 and are subject to the requirements of Environmental Authority (EA) EPML00873613, dated 10 January 2018.

The indicative site layout is presented in **Figure 1**.

Figure 1 Site Location



The area around the expanded East Environmental Dam has the following characteristics:

- The topography surrounding the dam gently falls from south to north – northeast, creating a high point at the southern end of Borrow Area 3 and a low point at the north-eastern corner of Borrow Area 2 with a change in elevation of approximately 4m.
- Vegetation is limited to Borrow Area 2 and consists of ground cover and sparse shrubbery. As excavation has already started at Borrow Area 3 most vegetation has already been cleared.
- The existing pond has a footprint of 7,850m² and an approximate depth of 5m.
- Borrow Area 2 currently has a topsoil stockpile over its footprint (10,400m²) and Borrow Area 3 has already had excavation works commenced with a rough footprint of 11,100m² and depth of 4m.
- There is an existing spillway for the East Environmental Dam located on the southern edge of Borrow Area 2 which will remain.
- A powerline that was located to the west of the east environmental dam has been removed.

The area of Borrow Area 4 has the following characteristics:

- The topography surrounding the pit gently falls from north to south, with a change in elevation of approximately 5m across Borrow Area footprint.
- The area vegetated with only a few small shrubs and patches of ground cover remain.
- The area approved for clearing around borrow pit 4 has a footprint of 60,625m².
- An access track runs through the northern end of the area approved for clearing and thus the excavation footprint will stop south of this road.
- A powerline that was located to the west of the east environmental dam has been removed.

Both dams are required for sourcing borrow materials for the capping the adjacent TSF2. The following sections discuss sizing, design details and the CCA. RPEQ certification is provided in **Appendix D**.

3 Dam Sizing

3.1 Expanded East Environmental Dam

As the East dam is to be used to catch erosion and sediment laden runoff, hydraulic modelling has been undertaken to establish the minimum required capacity. This has been based on:

- Catchment area of 37.4 ha (from site LIDAR supplied 10/5/21);
- Storage is to receive stormwater runoff but not a Mine Affected Water (Based on DES Model Mining Guideline definition);
- Required storm event volume captured is for 1% AEP 24 hour event (depth of 115 mm);
- 70% runoff response; and
- Storage has a low consequence category (refer Section 5 for CCA).

The resulting storage capacity is therefore 49.2ML.

3.2 Borrow Area 4

The majority of water contained within the Borrow Pit 4 will be direct rainfall however hydraulic modelling has been undertaken to establish the minimum required capacity. This has been based on:

- Catchment area of 15.45 ha (from site LIDAR supplied 10/5/21);
- Storage is to receive stormwater runoff but not a Mine Affected Water;
- Required storm event volume captured is for 10% AEP 24 hour event (depth of 115 mm);
- 70% runoff response; and
- Storage has a low consequence category (refer Section 5 for CCA).

The resulting storage capacity is therefore 12.3ML.

4 Detailed Design

4.1 Expanded East Environmental Dam

The East Dam expansion has been modelled using the following conditions:

- Dam remains in cut (below ground). It is understood that the final depth will be dictated by the quality and quantity of material suitable for TSF2 capping, however for design purposes the maximum excavation depth over Borrow Area 2 and Borrow Area 3 is to be 2m except where current borrow works have already exceeded this level. On final excavation, the profile will be forwarded to SLR for revision of the CCA if required.
- Maximum side slopes of 1m vertical and 3m horizontal.
- Expanded footprint covers adjacent Borrow Areas 2 and 3, for a total area of 42,875m².
- Dam crest is at RL 261m.
- Allowing for a standard 0.5m freeboard, dam has a top water level (TWL) of RL 260.5m.
- Dam has a capacity of 82.5ML to TWL (for the assumed 2m maximum depth), which is greater than the 49.2ML required.

Design drawings are contained in 623.30104_D01–D03_Design Drawings Rev_A in **Appendix C**.

4.2 Borrow Area 4

The rainfall catchment area for Borrow Area 4 is 15.45 ha. The surface area of the pit is 5.2 ha.

The borrow pit has been modelled using the following conditions:

- Excavation remains in cut (below ground).
- Maximum side slopes of 1m vertical and 3m horizontal.
- It is understood that the final depth will be dictated by the quality and quantity of material suitable for TSF2 capping, however for design purposes the maximum excavation depth of 3m has been assumed. On final excavation, the profile will be forwarded to SLR for revision of the CCA if required.

- Area of approved clearing optimized to avoid access track.
- Dam crest is undulating but has a minimum RL. 262.7m.
- Allowing for a standard 0.5m freeboard Pit has a top water level (TWL) of RL. 262.2m
- Pit has a capacity of 14ML to TWL.

Design drawings are contained in 623.30104_D01 and D04 and D05_Design Drawings Rev_A in **Appendix C**.

5 Consequence Category Assessments

5.1 Review of publicly available databases

A review of online databases for relevant ecological and environmental datasets was undertaken with reference to the following sources:

- State Planning Policy Mapping Database (Queensland Government);
- Vegetation Mapping and Vegetation Management Report (Queensland Government);
- Protect Matters Search Tool (Department of Agriculture, Water and the Environment). Environmental significance or other matters protected by the *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999*; and
- Wetland Maps and Information (Department of Environment and Science).

The findings from the searches at Osborne Mine are summarised in the following sections.

5.1.1 State Planning Policy Mapping Database

The State Planning Policy Lot Plan Search results are as follows:

Biodiversity

- Matters of State Environmental Significance (MSES) – Regulated vegetation - intersecting a watercourse is noted near the East Dam.

Emissions and Hazardous Activities

- No activities within 500m of either structure.

Natural Hazards Risk and Resilience

- Flood hazard area not within 500m of either structure.
- Bushfire prone area is noted near both structures.

5.1.2 Vegetation Mapping and Vegetation Management Report (Queensland Government)

The Vegetation Management Report results are as follows:

The Regulated Vegetation Management Map

- Results list the mine site as Category X area (Exempt clearing work Freehold, Indigenous and Leasehold land) and the surrounding area is categorised as Category B area (Remnant vegetation)

Protected Plants Flora Survey Trigger Map:

- Results listed not a high-risk area.

Vegetation Management Supporting Map:

- Results listed as Category A or B area that is a least concern regional ecosystem.

5.1.3 Protect Matters EPBC

The *EPBC Act* Protected Matters Report results are as follows:

Matters of National Environmental Significance

- 9 listed threatened species; and
- 10 listed migratory species.

Other Matters Protected by the EPBC Act

- 15 listed marine species.

Extra Information

- 12 invasive species.

5.1.4 Wetland Maps and Information

The Wetland Interactive Map Search results yielded the following results:

Groundwater Dependant Ecosystems

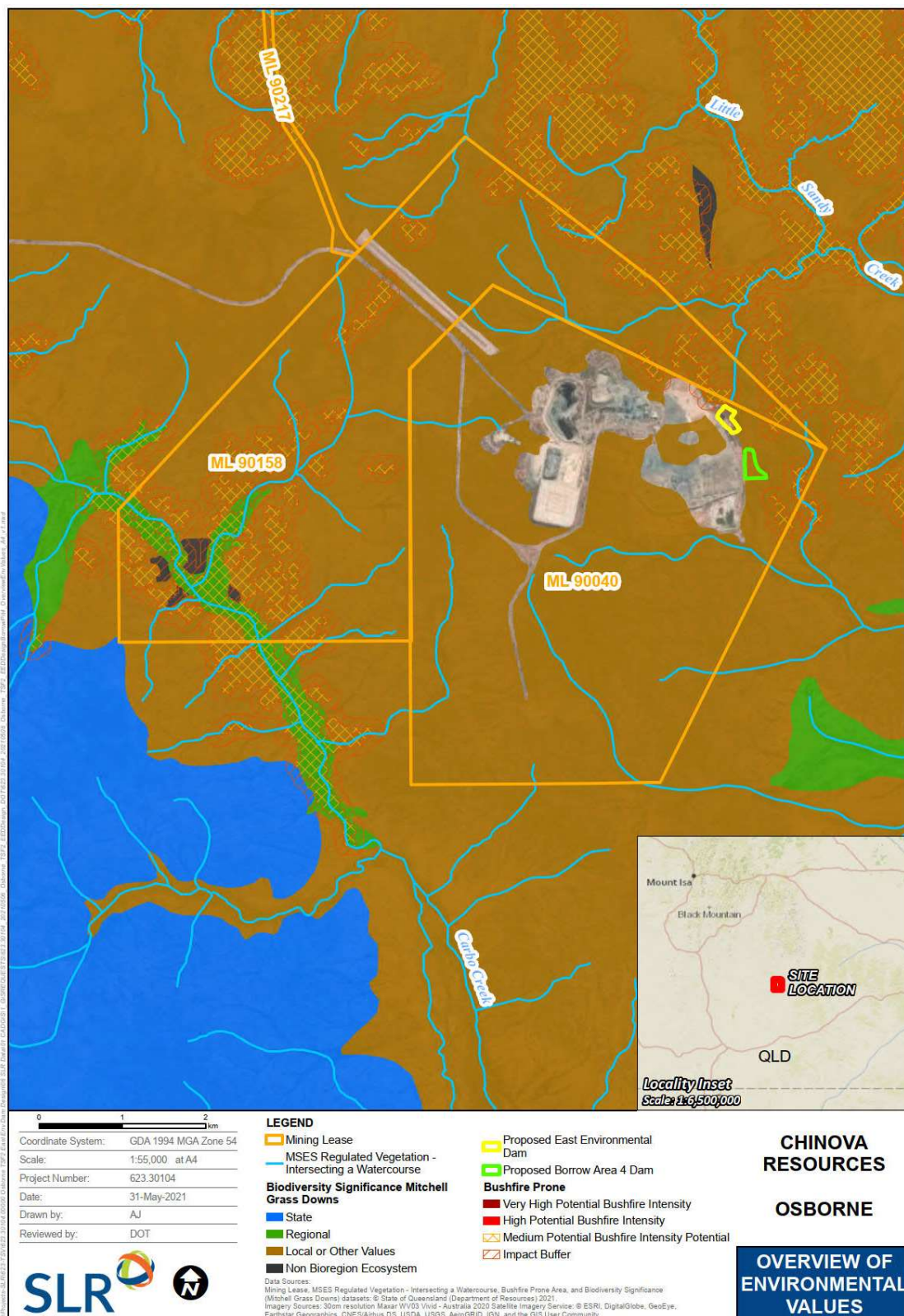
There are no groundwater dependent ecosystems, and no potential groundwater dependent aquifers are mapped nearby.

Land Use

The proposed structures are located between Land Use categorised as mining and grazing native vegetation.

Figure 2 provides a summary of environmental values in the vicinity of the proposed East Dam expansion and Borrow Area 4.

Figure 2 Overview of Environmental Values



5.2 Regulatory Context

A hazardous dam CCA has been carried out for the proposed East Environmental Dam expansion in accordance with the *Manual for assessing consequence and hydraulic performance of structures*, 2016.

All structures that are classified as dams or levees must have their consequence category assessed based on the potential environmental harm that would result from failure event scenarios. The consequence category 'High', 'Significant', or 'Low' will determine whether the structure is a 'regulated structure'. A structure is regulated if it is of 'High' or 'Significant' consequence classification. The consequence category of any structure is the highest consequence category determined under any of the assessment criteria set out in the Manual.

This CCA has been established by Lewis Smith reviewed by Danielle O'Toole (RPEQ 05966). Danielle is suitably qualified with more than 15 years' experience in dam design, operations and safety.

The consequence category of a structure must be for each of the following failure event scenarios:

- 'Failure to contain – seepage' – spills or releases to ground and/or groundwater via seepage from the floor and/or structure sides;
- 'Failure to contain – overtopping' – spills or releases from the structure that result from loss of containment due to overtopping; and
- 'Dam break' – collapse of the structure due to any possible cause.

5.3 Expanded East Environmental Dam CCA

Key considerations for the CCA are:

- **Dam break:** All water will be stored in the excavated pit therefore dam break is not applicable.
- **Failure to contain – overtopping:**
 - Surface water is not used for human consumption.
 - Surface water is seasonal and when it does flow is subject to high sediment loads due to high erosion in the storm events. Outcropping mineralisation on the site will contribute naturally to elevations in total metals in receiving water and stream sediment, hence overtopping will not significantly impact on surface waters.
- **Failure to contain – seepage:**
 - There are no groundwater dependent ecosystems in the vicinity of the East Dam.
 - Riparian vegetation along the nearby creek lines is supported by seasonal creek flow and shallow alluvial sediment deposits. There is no upward connection from the deeper aquifer sections to these shallow alluvial sediments.
 - There is no human consumption of groundwater resources.

The complete consequence category assessment is presented in **Appendix A**.

Based on the surface runoff capacity being significantly less than the available pit volume, all of which is below natural grade, and limited downstream groundwater and surface water users, it is concluded that the structure would be rated as a **Low consequence structure**.

5.4 Borrow Area 4

Key considerations for the CCA are:

- **Dam break:** All water will be stored in the excavated pit therefore dam break is not applicable.
- **Failure to contain – overtopping:**
 - Surface water is not used for human consumption.
 - Surface water is seasonal and when it does flow is subject to high sediment loads due to high erosion in the storm events. Outcropping mineralisation on the site will contribute naturally to elevations in total metals in receiving water and stream sediment, hence overtopping will not significantly impact on surface waters.
- **Failure to contain – seepage:**
 - There are no groundwater dependent ecosystems in the vicinity of the Borrow Area 4 Dam.
 - Riparian vegetation along the nearby creek lines is supported by seasonal creek flow and shallow alluvial sediment deposits. There is no upward connection from the deeper aquifer sections to these shallow alluvial sediments.
 - There is no human consumption of groundwater resources.

The complete consequence category assessment is presented in **Appendix B**.

Based on the inflow of water consisting of rainwater and not mine-affected water and limited downstream groundwater and surface water users, it is concluded that the structure would be rated as a **Low consequence structure**.

As noted, the final excavation profile will be dictated by the quality and quantity of materials encountered in both areas, for use in capping of TSF2. On completion of excavation, the final profiles are to be forwarded to SLR for revision of the CCA if required.

6 Closure

We trust this submission meets your requirements. We are happy to discuss our report with you further and will work collaboratively with you to refine the subsequent Consequence Category Assessment (CCA) outlined in this report. We also draw your attention to our standard limitations (**Section 7**), which provides additional detail about the utilisation of this report.

7 Limitations

This Document has been provided by SLR Consulting (“SLR”) subject to the following limitations. This Document has been prepared for the particular purpose outlined in SLR’s proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

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APPENDIX A

Expanded East Environmental Dam CCA Notes and Sources

Expanded East Environmental Dam

ENVIRONMENTAL HARM	CONSEQUENCE CATEGORIES			CATEGORY	ASSESSMENT OF EXPANDED EAST ENVIRONMENTAL DAM		
	HIGH (H)	SIGNIFICANT (S)	LOW (L)				
					Failure to Contain - Seepage	Failure to Contain - Overtopping	Dam Break
Harm to Humans	Location such that people are routinely present in the failure path and if present loss of life to greater than 10 people is expected. 7 <i>Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.</i>	Location such that people are routinely present in the failure path and if present loss of life to 1 person or greater but less than 10 people is expected. 7 <i>Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.</i>	Location such that people are not routinely present in the failure path and loss of life is not expected. 7 <i>Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break scenario.</i>	L	N/A	N/A	Dam is below grade, therefore dam break is not applicable
	Location such that contamination of waters (surface and/or groundwater 8) used for human consumption could result in the health of 20 or more people being affected 9 .	Location such that contamination of waters (surface and/or groundwater 8) used for human consumption could result in the health of 10 or more people but less than 20 people being affected.	Location such that contamination of waters (surface and/or groundwater 8) used for human consumption could result in the health of less than 10 people being affected. 9	L	Regional hydrogeology is low permeability and the ground water that may exist in perched water tables is mineralised to a high degree. The aquifers are not known to be used for drinking water. Given the low permeability of the underling materials and the size of the site it is unlikely that an seepage would travel off site.	Surface water is seasonal and when it does flow is subject to high sediment loads due to high erosion in the storm events. Outcropping mineralisation on the site will contribute naturally to elevations in total metals in receiving water and stream sediment, hence overtopping unlikely to significantly impact on surface waters. Surface water is not used for human consumption.	Dam is below grade, therefore dam break is not applicable

Expanded East Environmental Dam

ENVIRONMENTAL HARM	CONSEQUENCE CATEGORIES			CATEGORY			
	HIGH (H)	SIGNIFICANT (S)	LOW (L)		ASSESSMENT OF EXPANDED EAST ENVIRONMENTAL DAM		
General Environmental Harm	Location such that: a) Contaminants may be released to areas of MNES, MSES or HEV waters that are not already authorised to be disturbed to at least the same extent under other conditions of this authority subject to any applicable (Significant Values); and offset commitment b) Adverse effects ¹⁰ on Significant Values are likely; and to cause at least one of the following: i) Loss or damage or remedial costs greater than \$50,000,000; or ii) Remediation of damage is likely to take 3 years or more; or iii) The adverse effects are likely to involve significantly and permanently altered ecosystems; or iv) The area of damage (including downstream effects) is likely to be at least 5 km ² .	Adverse effects to Significant Values would be likely but those adverse effects do not meet the thresholds for the High consequence category and instead would be likely to cause at least one of the following i) to iv); or Location such that adverse effects to environmental values classed as slightly or moderately disturbed waters ¹¹ , wetland of general ecological significance ¹² , riverine areas, springs or lakes and associated flora and fauna (Moderate Values), and the adverse effects are likely to cause at least one of the following i) to iv): i) Loss or damage or remedial costs greater than \$10,000,000 but less than \$50,000,000; or ii) Remediation of damage is likely to take more than 6 months but less than 3 years; or iii) The adverse effects are likely to involve significantly and permanently altered ecosystems; or iv) The area of damage (including downstream effects) is likely to be at least 1 km but less than 5 km	Location such that either: a) Contaminants are unlikely to be released to areas of Significant Values or Moderate Values; or b) Contaminants are likely to be released to those areas, but would be unlikely to meet any of the minimum thresholds specified for the Significant Consequence Category for adverse effects. ¹⁰	L	There are no groundwater dependent ecosystems mapped nearby the dam.	Remediation costs unlikely to meet any of the minimum thresholds specified for the Significant Consequence Category.	Dam is below grade, therefore dam break is not applicable
General economic loss or property damage	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to path would be expected to rehabilitation, compensation ¹³)	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require \$1million and greater but less than \$10 million in rehabilitation, compensation, repair or rectification costs ¹³	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require less than \$1 million in rehabilitation, compensation, repair or rectification costs ¹³	L	There are no third party assets in the potential failure paths.	There are no third party assets in the potential failure paths.	There are no third party assets in the potential failure paths.

Expanded East Environmental Dam

ENVIRONMENTAL HARM	CONSEQUENCE CATEGORIES			CATEGORY	ASSESSMENT OF EXPANDED EAST ENVIRONMENTAL DAM
	HIGH (H)	SIGNIFICANT (S)	LOW (L)		

⁶ To be used for all failure event scenarios

⁷ 'People routinely present in the failure path' could be considered to be people who occupy buildings or other places of occupation that lie within the failure impact zone. For the purposes of this Manual, this should refer to people other than site personnel engaged by the resource operation and located on the tenements and tenure associated with the resource operation; for other ERAs, it would be the 'premises referred to in the authority'. It should be noted that while this is appropriate for the assessment of consequence categories in accordance with this Manual, adherence to the requirements of this Manual does not limit, amend or change in any way, any other requirements to be complied with under relevant health and safety acts or legislation that requires the safety of site personnel to be considered.

⁸ When considering potential impacts on groundwater, it is not envisaged that a full hydrogeological assessment will be required in all cases. Any consideration of potential impacts on groundwater systems should consider the water quality of the potential receiving aquifer as well as the quality of fluid stored in the regulated dam. Existing groundwater drawdown in areas surrounding resource operations (e.g. drawdown as a result of mine pit or underground mine dewatering) can also be considered when assessing the consequence of dam seepage on groundwater systems.

⁹ 'An adverse effect on human health means a physiological effect on human health and does not include an impact on the quality of downstream water that merely negatively affects taste and which is unlikely to cause persons to become physically ill.

¹⁰ Adverse effects includes chronic and acute effects where an acute effect is on living organism/s which results in severe symptoms that develop rapidly, and a chronic effect is an adverse effect on a living organism/s which develops slowly. In some instances, it may be necessary to carry out or reference existing ecological/toxicological studies to assess the impacts of contaminants on living organisms.

¹¹ See Water EPP for definitions

¹² Wetland of general ecological significance' means a wetland shown on a map of referable wetland as a 'general ecologically significant wetland' or 'wetland of other environmental value'.

¹³ This does not include the holder's own mine or gas production, on-site industrial or commercial assets, the holder's workers' accommodation, agricultural facilities on the holder's land such as a farm shed or farm dam or infrastructure solely for servicing the holder.

Criteria has been adopted from Queensland Globe (<https://qldglobe.information.qld.gov.au>). Layers used:
Matters of State Environmental Significance (MSES) wildlife habitat:
- Wildlife habitat(endangered and special least concern animal)
- Vegetation and habitat
MSES conservation areas:
- Protected areas (all)
Protected plants trigger map
- Groundwater Dependent Ecosystems (GDE)
- Watercourse layer - Inland water
AND <https://qldspatial.information.qld.gov.au/biomaps>
using the layers:
- WildNet conservation significant sightings
- Conservation significant buffered streams
- Biodiversity significant
Sources:
<https://qldglobe.information.qld.gov.au>
<https://qldspatial.information.qld.gov.au/biomaps>

APPENDIX B

Borrow Pit 4 CCA
Notes and Sources

Borrow Area 4

ENVIRONMENTAL HARM	CONSEQUENCE CATEGORIES			CATEGORY			
	HIGH (H)	SIGNIFICANT (S)	LOW (L)		ASSESSMENT OF BORROW AREA 4		
					Failure to Contain - Seepage	Failure to Contain - Overtopping	Dam Break
Harm to Humans	Location such that people are routinely present in the failure path and if present loss of life to greater than 10 people is expected. 7 <i>Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.</i>	Location such that people are routinely present in the failure path and if present loss of life to 1 person or greater but less than 10 people is expected. 7 <i>Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.</i>	Location such that people are not routinely present in the failure path and loss of life is not expected. 7 <i>Note: The requirement to consider the location of people in the failure path is only relevant to the 'dam break' scenario.</i>	L	N/A	N/A	Dam is below grade, therefore dam break is not applicable.
	Location such that contamination of waters (surface and/or groundwater 8) used for human consumption could result in the health of 20 or more people being affected 9 .	Location such that contamination of waters (surface and/or groundwater 8) used for human consumption could result in the health of 10 or more people but less than 20 people being affected.	Location such that contamination of waters (surface and/or groundwater 8) used for human consumption could result in the health of less than 10 people being affected. 9	L	Regional hydrogeology is low permeability and the ground water that may exist in perched water tables is mineralised to a high degree. The aquifers are not known to be used for drinking water. Given the low permeability of the underling materials and the size of the site it is unlikely that an seepage would travel off site.	Surface water is seasonal and when it does flow is subject to high sediment loads due to high erosion in the storm events. Outcropping mineralisation on the site will contribute naturally to elevations in total metals in receiving water and stream sediment, hence overtopping unlikely to significantly impact on surface waters. Surface water is not used for human consumption.	Dam is below grade, therefore dam break is not applicable.

Borrow Area 4

ENVIRONMENTAL HARM	CONSEQUENCE CATEGORIES			CATEGORY	ASSESSMENT OF BORROW AREA 4		
	HIGH (H)	SIGNIFICANT (S)	LOW (L)				
General Environmental Harm	Location such that: a) Contaminants may be released to areas of MNES, MSES or HEV waters that are not already authorised to be disturbed to at least the same extent under other conditions of this authority subject to any applicable (Significant Values); and offset commitment b) Adverse effects ¹⁰ on Significant Values are likely; and to cause at least one of the following: i) Loss or damage or remedial costs greater than \$50,000,000; or ii) Remediation of damage is likely to take 3 years or more; or iii) The adverse effects are likely to involve significantly and permanently altered ecosystems; or iv) The area of damage (including downstream effects) is likely to be at least 5 km ² .	Adverse effects to Significant Values would be likely but those adverse effects do not meet the thresholds for the High consequence category and instead would be likely to cause at least one of the following i) to iv); or Location such that adverse effects to environmental values classed as slightly or moderately disturbed waters ¹¹ , wetland of general ecological significance ¹² , riverine areas, springs or lakes and associated flora and fauna (Moderate Values), and the adverse effects are likely to cause at least one of the following i) to iv): i) Loss or damage or remedial costs greater than \$10,000,000 but less than \$50,000,000; or ii) Remediation of damage is likely to take more than 6 months but less than 3 years; or iii) The adverse effects are likely to involve significantly and permanently altered ecosystems; or iv) The area of damage (including downstream effects) is likely to be at least 1 km but less than 5 km	Location such that either: a) Contaminants are unlikely to be released to areas of Significant Values or Moderate Values; or b) Contaminants are likely to be released to those areas, but would be unlikely to meet any of the minimum thresholds specified for the Significant Consequence Category for adverse effects. ¹⁰	L	There are no groundwater dependent ecosystems mapped nearby the dam.	Remediation costs unlikely to meet any of the minimum thresholds specified for the Significant Consequence Category.	Dam is below grade, therefore dam break is not applicable.
General economic loss or property damage	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to path would be expected to rehabilitation, compensation ¹³)	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require \$1million and greater but less than \$10 million in rehabilitation, compensation, repair or rectification costs ¹³	Location such that harm (other than a different category of harm as specified above) to third party assets in the failure path would be expected to require less than \$1 million in rehabilitation, compensation, repair or rectification costs ¹³	L	There are no third party assets in the potential failure paths.	There are no third party assets in the potential failure paths.	There are no third party assets in the potential failure paths.

Borrow Area 4

ENVIRONMENTAL HARM	CONSEQUENCE CATEGORIES			CATEGORY	ASSESSMENT OF BORROW AREA 4
	HIGH (H)	SIGNIFICANT (S)	LOW (L)		

⁶ To be used for all failure event scenarios

⁷ 'People routinely present in the failure path' could be considered to be people who occupy buildings or other places of occupation that lie within the failure impact zone. For the purposes of this Manual, this should refer to people other than site personnel engaged by the resource operation and located on the tenements and tenure associated with the resource operation; for other ERAs, it would be the 'premises referred to in the authority'. It should be noted that while this is appropriate for the assessment of consequence categories in accordance with this Manual, adherence to the requirements of this Manual does not limit, amend or change in any way, any other requirements to be complied with under relevant health and safety acts or legislation that requires the safety of site personnel to be considered.

⁸ When considering potential impacts on groundwater, it is not envisaged that a full hydrogeological assessment will be required in all cases. Any consideration of potential impacts on groundwater systems should consider the water quality of the potential receiving aquifer as well as the quality of fluid stored in the regulated dam. Existing groundwater drawdown in areas surrounding resource operations (e.g. drawdown as a result of mine pit or underground mine dewatering) can also be considered when assessing the consequence of dam seepage on groundwater systems.

⁹ 'An adverse effect on human health means a physiological effect on human health and does not include an impact on the quality of downstream water that merely negatively affects taste and which is unlikely to cause persons to become physically ill.

¹⁰ Adverse effects includes chronic and acute effects where an acute effect is on living organism/s which results in severe symptoms that develop rapidly, and a chronic effect is an adverse effect on a living organism/s which develops slowly. In some instances, it may be necessary to carry out or reference existing ecological/toxicological studies to assess the impacts of contaminants on living organisms.

¹¹ See Water EPP for definitions

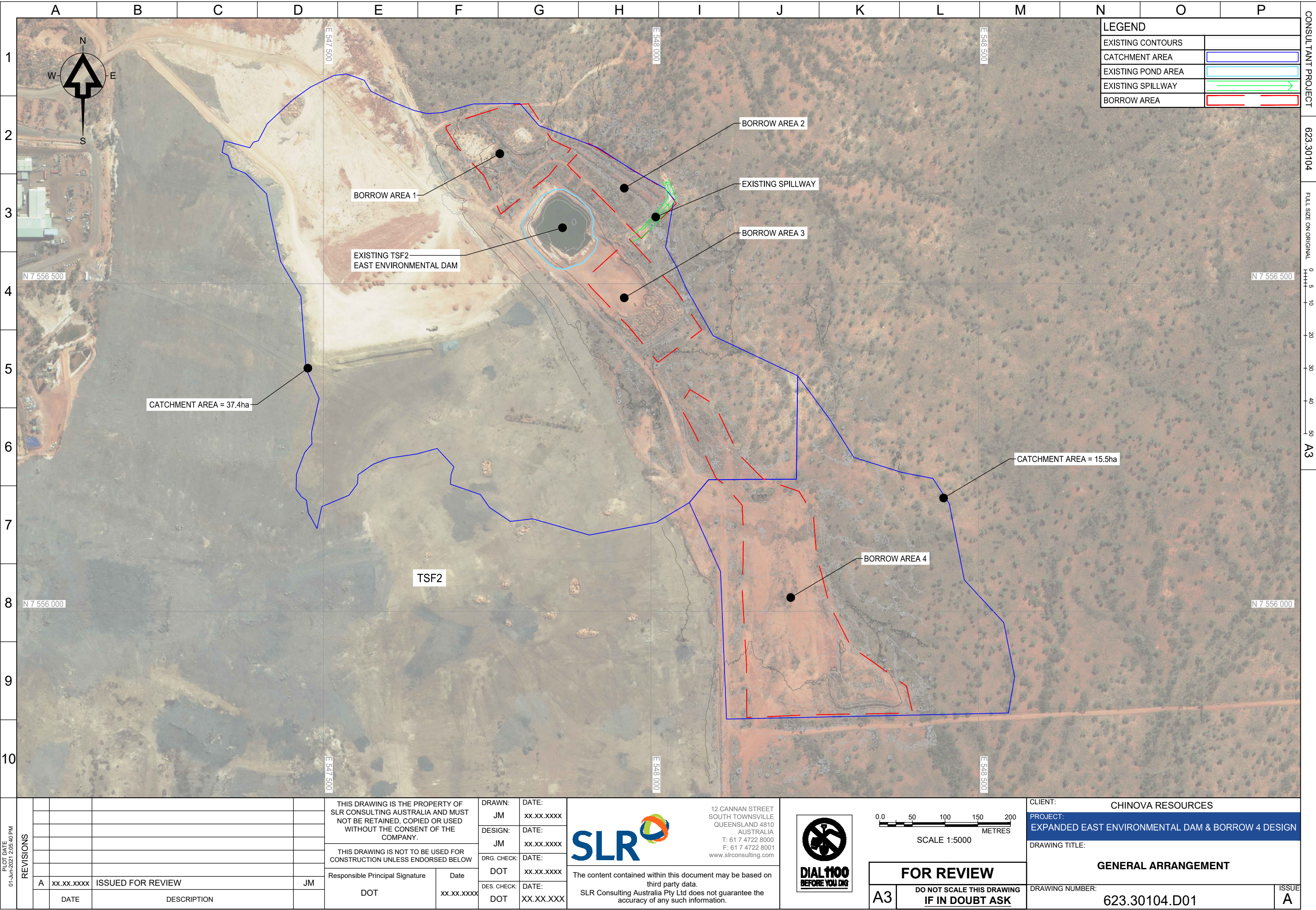
¹² Wetland of general ecological significance' means a wetland shown on a map of referable wetland as a 'general ecologically significant wetland' or 'wetland of other environmental value'.

¹³ This does not include the holder's own mine or gas production, on-site industrial or commercial assets, the holder's workers' accommodation, agricultural facilities on the holder's land such as a farm shed or farm dam or infrastructure solely for servicing the holder.

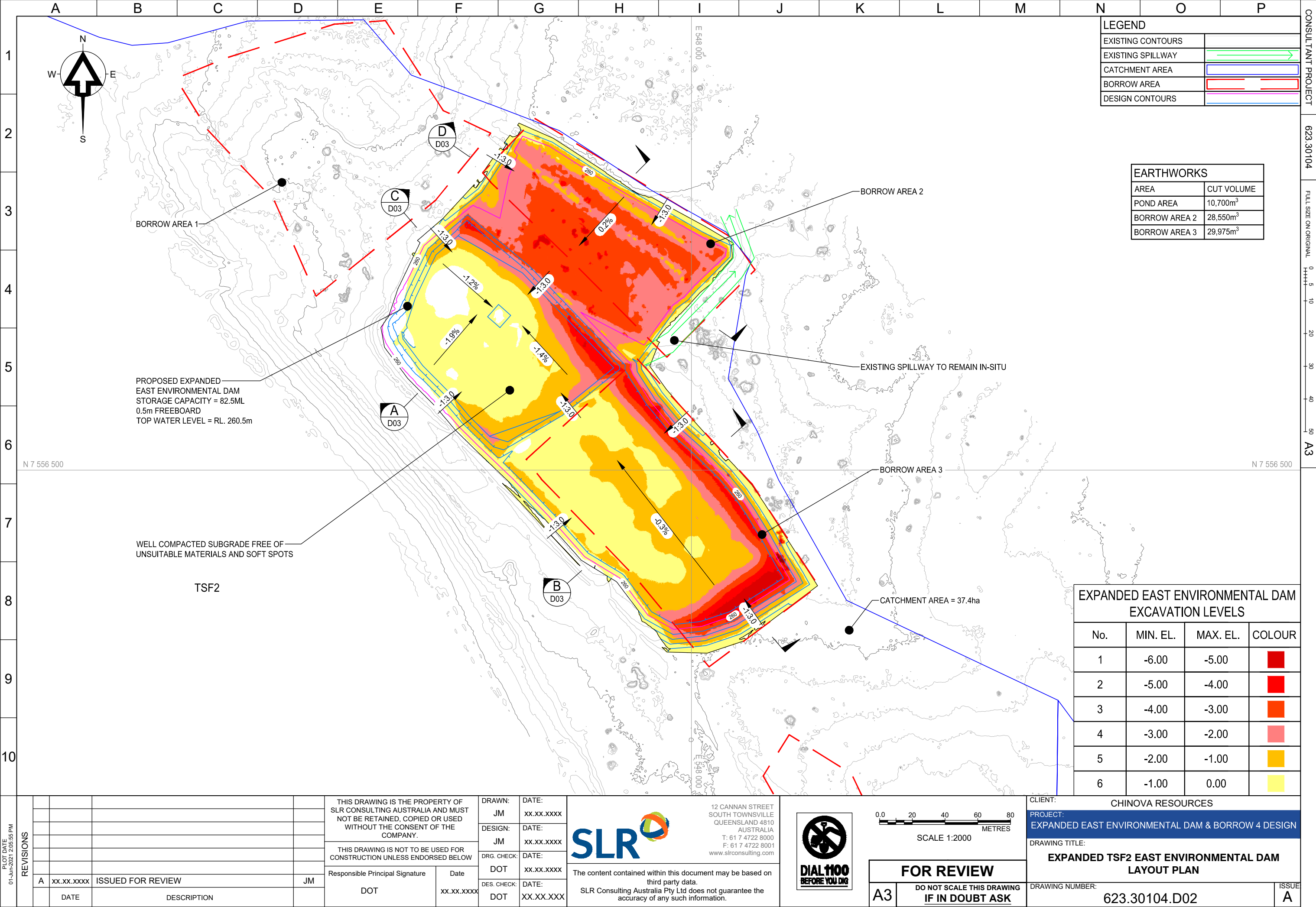
Criteria has been adopted from Queensland Globe (<https://qldglobe.information.qld.gov.au>). Layers used:
Matters of State Environmental Significance (MSES) wildlife habitat:
- Wildlife habitat(endangered and special least concern animal)
- Vegetation and habitat
MSES conservation areas:
- Protected areas (all)
Protected plants trigger map
- Groundwater Dependent Ecosystems (GDE)
- Watercourse layer - Inland water
AND <https://qldspatial.information.qld.gov.au/biomaps>
using the layers:
- WildNet conservation significant sightings
- Conservation significant buffered streams
- Biodiversity significant
Sources:
<https://qldglobe.information.qld.gov.au>
<https://qldspatial.information.qld.gov.au/biomaps>

APPENDIX C

Design Drawings



PLOT DATE 01-Jun-2021 2:05:40 PM	REVISIONS				THIS DRAWING IS THE PROPERTY OF SLR CONSULTING AUSTRALIA AND MUST NOT BE RETAINED, COPIED OR USED WITHOUT THE CONSENT OF THE COMPANY.		DRAWN: JM	DATE: xx.xx.xxxx	<div></div> <div>12 CANNAN STREET SOUTH TOWNSVILLE QUEENSLAND 4810 AUSTRALIA T: 61 7 4722 8000 F: 61 7 4722 8001 www.slrconsulting.com</div> <div></div> <div>The content contained within this document may be based on third party data. SLR Consulting Australia Pty Ltd does not guarantee the accuracy of any such information.</div>	<div><div>CLIENT: CHINOVA RESOURCES</div><div>PROJECT: EXPANDED EAST ENVIRONMENTAL DAM & BORROW 4 DESIGN</div><div>DRAWING TITLE: GENERAL ARRANGEMENT</div><div>DRAWING NUMBER: 623.30104.D01</div><div>ISSUE A</div></div>			
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		A	xx.xx.xxxx	ISSUED FOR REVIEW	JM	Responsible Principal Signature	DATE	DOT			xx.xx.xxxx		
			DATE	DESCRIPTION				DES. CHECK: DOT			DATE: XX.XX.XXX		



LEGEND	
EXISTING CONTOURS	
EXISTING SPILLWAY	
CATCHMENT AREA	
BORROW AREA	
DESIGN CONTOURS	

EARTHWORKS	
AREA	CUT VOLUME
POND AREA	10,700m³
BORROW AREA 2	28,550m³
BORROW AREA 3	29,975m³

EXPANDED EAST ENVIRONMENTAL DAM EXCAVATION LEVELS			
No.	MIN. EL.	MAX. EL.	COLOUR
1	-6.00	-5.00	
2	-5.00	-4.00	
3	-4.00	-3.00	
4	-3.00	-2.00	
5	-2.00	-1.00	
6	-1.00	0.00	

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REVISIONS

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	DATE	DESCRIPTION	

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DES. CHECK: DOT

DATE: xx.xx.xxxx

DATE: xx.xx.xxxx

DATE: xx.xx.xxxx

DATE: xx.xx.xxxx

12 CANNAN STREET
SOUTH TOWNSVILLE
QUEENSLAND 4810
AUSTRALIA
T: 61 7 4722 8000
F: 61 7 4722 8001
www.slrc consulting.com

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SCALE 1:2000

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CLIENT: CHINOVA RESOURCES

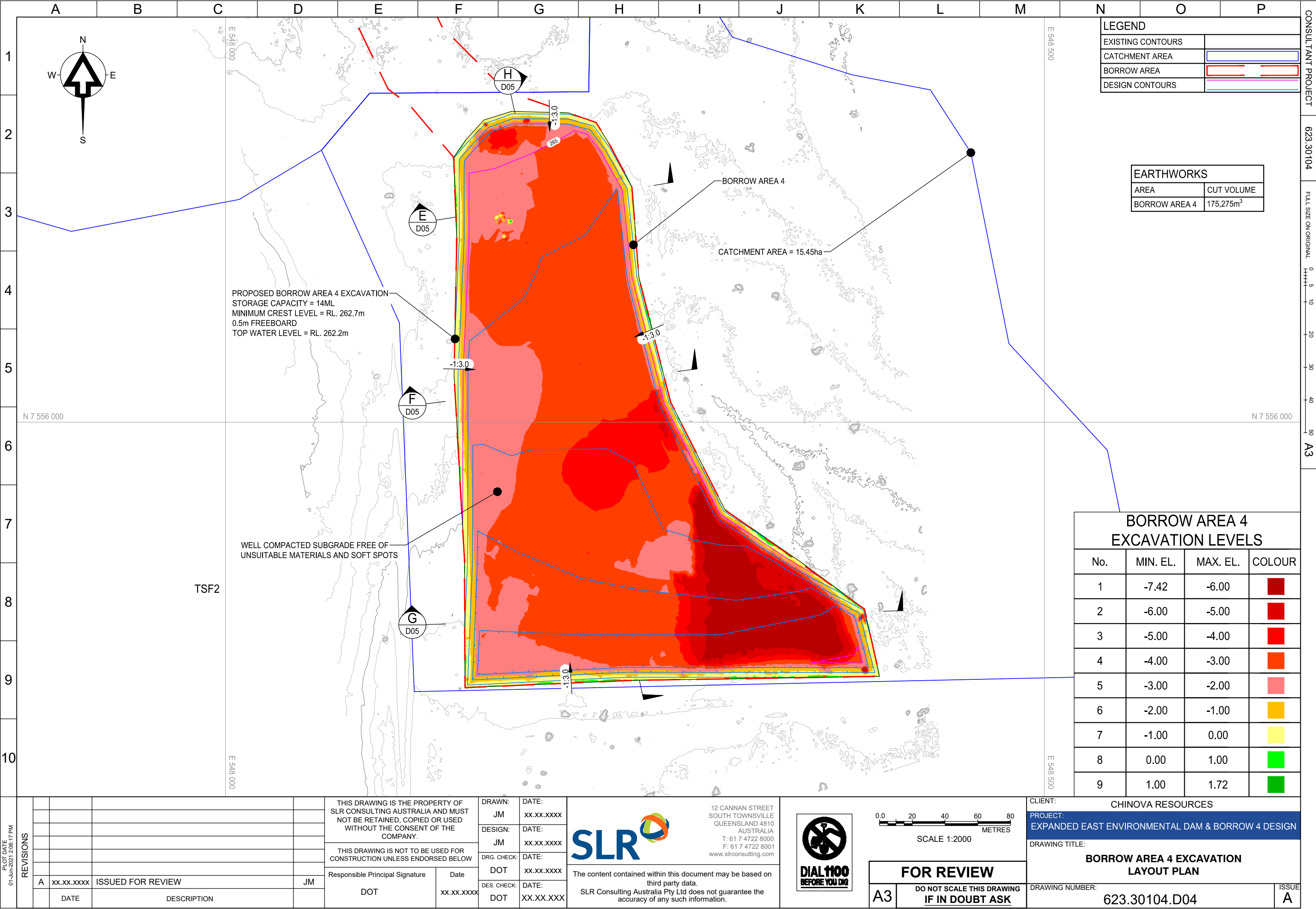
PROJECT: EXPANDED EAST ENVIRONMENTAL DAM & BORROW 4 DESIGN

DRAWING TITLE: EXPANDED TSF2 EAST ENVIRONMENTAL DAM
LAYOUT PLAN

DRAWING NUMBER: 623.30104.D02

ISSUE A

[illegible]



APPENDIX D

Form of Certification

Form of certification (consequence assessment/design plan)

Name of Registered Professional Engineer providing certification:

Danielle O'Toole - RPEQ 05966

Address of Registered Professional Engineer providing certification:

12 Cannon St, South Townsville, QLD, 4810

Statement of relevant experience

I hereby state that I am a Registered Professional Engineer of Queensland and meet the requirements of the definition of 'suitably qualified and experienced person'.

Statement of certification

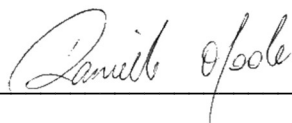
All relevant material relied upon by me, including subsidiary certifications of specialist components, where required by the environmental authority, is provided in the attached report "Osborne Mine – Detailed Design Report, East Environmental Dam and Borrow Area 4 Dam", dated 1 June 2021.

I hereby certify the report entitled "Osborne Mine – Detailed Design Report, East Environmental Dam and Borrow Area 4 Dam" (reference 623.30104-R01) dated 1 June 2021 for:

- Conditions G1-1 and G1-2 and G1-4 "Assessment of Hazard Category" of Authority Permit No. EMPL00873613, dated January 2018, apply; and
- The certification relates to the expansion of the East Environmental Dam and proposed Borrow Area 4 Dam.

I, Danielle O'Toole, declare that the information provided as part of this certification is true to the best of my knowledge. I acknowledge that it is an offence under section 480 of the *Environmental Protection Act 1994* to give the administering authority a document containing information that I know is false, misleading or incomplete in a material particular.

Signed:



Date: 1 June 2021

ASIA PACIFIC OFFICES

BRISBANE

Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

MACKAY

21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

PERTH

Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

AUCKLAND

Level 4, 12 O'Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

CANBERRA

GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

MELBOURNE

Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

SYDNEY

Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

NELSON

6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

DARWIN

Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

NEWCASTLE

10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

TOWNSVILLE

12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

GOLD COAST

Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

NEWCASTLE CBD

Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

WOLLONGONG

Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000